

Challenges for SEEDS

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1) Introduction

Based in part on the experience of the ESIP Federation, it is apparent that SEEDS (Strategic Evolution of the ESE Data Systems) must overcome many challenges, if it is to fulfil its stated goals. Among the more important challenges are the following:

- *How do you involve the broader community during these initial and following phases: including both users and providers?*

Mechanisms include advisory committees and workshops, but also there should be much deeper involvement. It's not just a matter of obtaining "inputs" and "responses" or even including consultants, if SEEDS is to be successful. There has to be much broader and more profound community engagement and ownership.

- *How do you deal with the distinctions between users and providers?*

Increasingly users become providers, and interactions between user/providers are developing in increasingly complex ways.

- *How does one decide what falls within the scope of SEEDS and what falls outside?*

User communities have developed and will develop their own standards, especially those relating to content. It should be the goal of SEEDS to adopt a minimalist approach, i.e. only to define the minimum set interfaces and standards needed to make a heterogeneous system feasible.

- *How does SEEDS deal with rapidly changing user requirements?*

One example of a very quickly evolving set of requirements and reactions to them is the MODIS Fire Rapid Response system for forests fires developed by NASA, UMD and the USFS (See the white paper by Carroll et al). From a start c. 18 months ago, the RRS has achieved sufficient operational success, to be featured in the President's 2003 budget in

Spring 2002 as a key model for future developments. If new uses and types of service continue to evolve and change as rapidly (and this is likely), there will be a crucial need to provide conditions allowing changing priorities to be accommodated and systems to change and evolve to satisfy them.

- *How do the present plans relate to the national and international dimensions?*

For SEEDS to be successful in supporting the NASA Earth Science goals it is essential that its users can also easily interact with other information systems within the US and internationally. Advantage could also be gained through involvement of elements of the international user and provider communities, such as GOFC, TCO and GODAE on the user side and key agencies and working groups on the supplier side, such as ESA, Eumetsat, NASDA and WGISS.

2) What leads to successful evolution of an information system?

We may gain some insight by considering evolution in a biological sense. Some of the conclusions that might be drawn by analogy are as follows:

- You can not plan evolution: but you can create conditions conducive to evolution.
- For systems to evolve requires a number of favorable sets of conditions.
- Permit all components of systems to change in response to changing external conditions (including both user needs and technological capabilities).
- Allow parts of the system to become extinct. (Failure is OK so long as it is genuinely accompanied by death and elimination; in human organizations this does not always happen).
- Allow competition to be inherent in all aspects of the system, so there is survival of the fittest.
- Avoid too many sudden/ catastrophic changes: (the very occasional meteoric impact is OK but they should not be too frequent).
- There should be sufficient sustaining resources available.

3) Why is simply asking “what do you want?” unlikely to give useful answers?

If asked "what do you want?" there is a strong tendency for users to “ask for the moon”, rather than ask for what is critical to their needs. There need to be some sorts of overall constraints so that users can begin to prioritise and establish what they need rather than they want. The issue of the rapidity in the evolution of needs also limits the value of such questions if they are asked too infrequently. Users often do not know what they will need especially when looking more than a few years ahead.

4) The scope of SEEDS

At one extreme the scope of SEEDS is merely a set of interfaces and standards with some costing tools. As an activity this may fairly characterize it at present. But implicitly or explicitly in many discussions the various types of functions, processes and data centers are also included and hence this concept of SEEDS represents a much more comprehensive concept. The original concept of NewDISS identified interfaces and standards as the principal components that had to be well defined. This did not imply that this was all that NewDISS should be and the early conceptual documents on NewDISS included all the various data centers as well, though it was concluded that the number and the specific functions of these did not need initially to be closely detailed. But within NASA there will need to be an ability to monitor performance and to make strategic decisions concerning the allocation of resources between different types of processes, functions and data centers.

5) Who decides how SEEDS will be established and how change will occur?

Imposing standards is generally regarded as being less successful than standards established by consensus. Currently SEEDS is strongly NASA-centric and even Goddard-centric. There are a variety of experiences from various entities that can help NASA engage a much wider range of stake-holders to design a process for establishing interface standards as well as other standards such as those relating to content. FGDC, OGC and the ESIP Federation all provide models by which community consensus for standards can be established.

One basic issue is in deciding which of the standards should be community-based and which

should be left to different groups to create their own standards. Such a process has to allow different needs to be expressed, to allow mechanisms to reach consensus and to make prototyping a key component that is easy to implement. There is a need not only to have user groups expert in their domains but also expert teams in the creation of standards.

6) Conclusions and a final recommendation.

Current work by the Formulation Team represents a major advance in the planning of SEEDS but to be successful it must engage user and provider communities much more closely.

It should be the highest priority for the current Formulation Team of the SEEDS activity to develop and implement organizational structures facilitating much deeper engagement of key stakeholders. This action itself must involve some of these stakeholders and should start immediately.